

## REMARKS

Claims 1-30 are pending in this application, with claims 1, 2, 6, 12, 13, 16, 22, and 23 being independent claims. Applicants have amended claims 1-3 and 12-14 and newly added claims 27-30 to more clearly define the features of the invention. No new matter has been added.

For the reasons explained below, Applicants respectfully request that the Examiner reconsider the present application and withdraw all of the claim rejections.

### 35 U.S.C. § 102 Rejection Based on Sagusa et al.

Claim 1 is rejected under 35 U.S.C. § 102(b) as being anticipated by Sagusa et al. (Japanese Patent Application Publication No. 09-165681). In view of the foregoing claim amendments and/or the following reasons, Applicants respectfully request reconsideration and withdrawal of this rejection.

Sagusa et al. fails to anticipate independent claim 1 because it does not disclose, among other things, that a heater and upper and lower ceramic-metal composites are cast in the base metal, and that "each of the upper and lower ceramic-metal composites comprises a preformed porous ceramic infiltrated with the base metal," as recited in independent claim 1. Instead, Sagusa et al. merely discloses a sheath heater 11 embedded in a plate of aluminum ceramic complex 12 which is covered with an aluminum rolled stock 13. As is apparent, not only does the aluminum ceramic complex 12 (i.e., construed by the Examiner as corresponding to the recited upper and lower ceramic-metal composite) fail to include "a preformed porous ceramic," but it also fails to be infiltrated with the aluminum rolled stock 13 (i.e., construed by the Examiner as corresponding to the recited base metal), both of which are required by claim 1.

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For at least these reasons, Sagusa et al. cannot anticipate independent claim 1. Thus, reconsideration and withdrawal of this rejection is respectfully requested.

35 U.S.C. § 103 Rejection Based on McMillin et al.

Claims 6, 8-11, 16, and 19-21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over McMillin et al. (U.S. Patent No. 5,835,334), according to the rationale in paragraphs 5 and 8 of the Office Action. Applicants respectfully traverse these rejections and request reconsideration and withdrawal of these rejections.

Independent claim 6 recites a susceptor including, among other things, "an upper ceramic-metal composite arranged above the heater" and "a ceramic electrostatic chuck ... having a coefficient of linear thermal expansion substantially the same as that of the upper ceramic-metal composite, and being joined to an upper surface of the upper ceramic-metal composite." Independent claim 16 recites a plasma processing apparatus including, among other things, a susceptor having a similar structural configuration as that of independent claim 6. For example, the susceptor of claim 16 includes, among other things, "an upper ceramic-metal composite arranged above the heater" and "a ceramic electrostatic chuck ... having a coefficient of linear thermal expansion substantially the same as that of the upper ceramic-metal composite, and being joined to an upper surface of the upper ceramic-metal composite."

The Examiner asserts in paragraph 5, subparagraph iv, that McMillin et al. discloses "[t]he electrostatic chuck (1 or 100; Figure 1) having a coefficient of linear thermal expansion substantially the same (column 5, lines 41-47 - at temperature below 200 °C) as that of the upper ceramic-metal composite [i.e., dielectric layer 1c] and being

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joined to an upper ceramic-metal composite.” Col. 5, lines 41-47, of McMillin et al., however, contains the following passage:

For the anodized aluminum cap, the cap temperature is typically maintained at  $\leq 200^{\circ}\text{C}$ . (usually  $100\text{-}150^{\circ}\text{C}$ ) to prevent cracking of the anodization due to differing thermal expansion coefficient for the anodized layer and base material. For the diamond or ceramic coated design, the cap temperature can be higher, but is typically  $< 350^{\circ}\text{C}$ .

As this passage of McMillin et al. plainly suggests, due to the difference in thermal expansion coefficient between the anodized layer and the base material, the cap temperature must be maintained below  $200^{\circ}\text{C}$ , i.e., in the range where the material expansion does not occur, in order to prevent cracking of the anodized layer. In other words, contrary to the Examiner’s assertion, McMillin et al. specifically discloses that the anodized layer (i.e., construed by the Examiner as corresponding to the recited upper ceramic-metal composite) has a different coefficient of linear thermal expansion from that of the base material (i.e., construed by the Examiner as corresponding to the recited ceramic electrostatic chuck). Therefore, McMillin et al. does not disclose, teach, or suggest, among other things, “a ceramic electrostatic chuck ... having a coefficient of linear thermal expansion substantially the same as that of the upper ceramic-metal composite,” as recited in independent claim 6.

In addition, McMillin et al. does not disclose “a ceramic electrostatic chuck ... being joined to an upper surface of the upper ceramic-metal composite,” as recited in independent claim 6. As discussed above, the Examiner construed that the anodized layer, or the dielectric layer, 1c corresponds to the recited upper ceramic-metal composite, and that the electrode cap 1 corresponds to the recited ceramic electrostatic chuck. See paragraph 5, subparagraphs ii and iv, of the Office Action. The electrode

cap 1, however, is joined to a bottom surface, rather than an upper surface, of the dielectric layer 1c. Therefore, McMillin et al. does not disclose, teach, or suggest, among other things, "a ceramic electrostatic chuck ... being joined to an upper surface of the upper ceramic-metal composite," as recited in independent claim 6.

For at least the reasons set forth above, independent claims 6 and 16, and their respective dependent claims, define non-obvious subject matter over the disclosure of MacMillin et al. Thus, Applicants respectfully request reconsideration and withdrawal of these rejections.

35 U.S.C. § 103 Rejection Based on McMillin et al. and Sagusa et al.

Claims 2, 5, 7, 12, 13, and 17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over McMillin et al. in view of Sagusa et al., according to the rationale discussed in paragraph 6 of the Office Action. In view of the foregoing amendments and the following reasons, Applicants respectfully request reconsideration and withdrawal of this rejection.

*Independent Claims 2 and 13 and Their Dependent Claims*

Independent claim 2 recites an electrode including, among other things, "a base metal formed of a cast metal," "a heater embedded in the base metal and arranged on a plane," and "a core metal plate embedded in the base metal and arranged substantially parallel to the plane and adjacent to the heater," "wherein the heater and the core metal are cast in the base metal, and the core metal plate is entirely surrounded by the base metal and is entirely in metal-to-metal contact with the base metal, and wherein a material forming the core metal plate has a rigidity higher than that of a material forming

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the base metal.” Independent claim 13 recites a plasma processing apparatus including an electrode having similar recitations to those of independent claim 2.

Neither McMillin et al. nor Sagusa et al. discloses, teaches, or suggests each and every structural element recited in independent claims 2 and 13. In particular, an electrode resulting from the asserted combination of McMillin et al. and Sagusa et al. would not have a core metal plate “entirely surrounded by the base metal and ... entirely in metal-to-metal contact with the base metal,” as recited in independent claims 2 and 13. For at least this reason, independent claims 2 and 13 and their respective dependent claims define novel and non-obvious subject matter over the asserted combination of McMillin et al. and Sagusa et al. Thus, reconsideration and withdrawal of this ground of rejection is respectfully requested.

*Independent Claim 12 and Its Dependent Claim*

Independent claim 12 recites a plasma processing apparatus including, among other things, an electrode having “a base metal made of a cast metal,” “an upper ceramic-metal composite arranged above the heater,” and “an lower ceramic-metal composite arranged below the heater,” “wherein the heater and the upper and lower ceramic-metal composites are cast in the base metal, and each of the upper and lower ceramic-metal composites comprises a preformed porous ceramic infiltrated with the base metal.”

Sagusa et al.’s lack of disclosure with respect to the recited configuration of the upper and lower ceramic-metal composites (i.e., “a preformed porous ceramic infiltrated with the base metal”) was discussed above in detail. McMillin et al. also does not make up for the deficiency of Sagusa et al. For at least these reasons, independent claim 12

and its dependent claim 15 are patentably distinguishable over the asserted combination of McMillin et al. and Sagusa et al. Thus, reconsideration and withdrawal of this ground of rejection is respectfully requested.

35 U.S.C. § 103 Rejections Based on McMillin et al., Sagusa et al., and Wang et al.

Claims 3, 4, 14, 15, 24, and 26 are rejected under 35 U.S.C. § 103(a) as being unpatentable over McMillin et al. and Sagusa et al., in view of Wang et al. (U.S. Patent No. 5,755,886), according to the rationale discussed in paragraph 7 of the Office Action.

Dependent claims 3 and 4 depend from independent claim 2, dependent claim 14 depends from independent claim 13, dependent claim 15 depends from independent claim 12, and dependent claim 24 and 25 depend from independent claim 1. As discussed above, independent claims 1, 2, 12, and 13 are patentably distinguishable over McMillin et al. and Sagusa et al. Moreover, Wang et al. does not cure the deficiencies of McMillin et al. and Sagusa et al. Consequently, these dependent claims should also be allowable at least by virtue of their dependency from allowable independent claims 1, 2, 12, and 13. Thus, reconsideration and withdrawal of this rejection is respectfully requested.

With respect to dependent claim 3, it is worth noting that Applicants have amended the claim to more clearly recite that the core metal plate has “a plurality of through-holes filled with the base metal, so that the base metal above and below the plate is bound together via the base metal in the through-holes.” As is apparent, none of the cited references discloses, teaches, or suggests, among other things, the above-mentioned configuration of a core metal plate. Therefore, claim 3 defines novel and non-obvious subject matter over the cited references.

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35 U.S.C. § 103 Rejections Warmough and Sagusa et al.

Claims 22 and 23 are rejected under 35 U.S.C. §103(a) as being unpatentable over Warmough (U.S. Patent No. 4,404,262) in view of Sagusa et al., according to the rationale discussed in paragraph 10 of the Office Action.

Each of independent claims 22 and 23 recites a method including, among other things, "placing a heater and a pair of porous ceramics in a mold with a positional relationship where the pair of porous ceramics are arranged above and below the heater respectively so that the heater is positioned therebetween," and "pouring a molten base metal into the mold to cast the pair of porous ceramics and the heater in the base metal, thereby infiltrating the porous ceramic with the base metal in order to form a ceramic-metal composite."

The Examiner admits that Watmough does not teach any method having a step of placing a heater inside the ceramic prior to the composite forming step. Nevertheless, the Examiner alleges that "[i]t would have been obvious ... to cast the apparatus of Sagusa following the method of Watmough to form a ceramic-metal composition ... [for] added strength."

Applicants respectfully urge that this allegation cannot establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a). To establish a *prima facie* case of obviousness, three basic criteria must be met. First, the prior art references when combined must teach or suggest all the claim elements. Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Finally, there must be a reasonable expectation of success. M.P.E.P. § 2143.

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As to the first criterion, in particular, the asserted combination of Watmough and Sagusa et al. does not teach or suggest all of the claimed elements. The Examiner relies on Sagusa et al. for its alleged teaching of "[casting] the pair of porous ceramics and the heater in the base metal." As discussed above, however, Sagusa et al. does not disclose any step of casting the pair of porous ceramics and the heater in a base metal. In fact, Sagusa et al. does not even disclose a pair of porous ceramics. Thus, the first criterion for a proper *prima facie* case of obviousness has not been met.

As to the third criterion, not only does the asserted combination of Watmough and Sagusa et al. fail to teach or suggest the claimed invention, the combination does not show any reasonable expectation of success. For example, even if the Watmough's method were somehow applied in making an electrode or a susceptor having a heater, the heater placed in a female mold portion 22 of Watmough would most likely be dislocated from its appropriate position or become warped, resulting in a defective electrode or susceptor. It appears that the Watmough's method can be used only when a single porous material is placed at the bottom of the female mold portion 22, and no other component part exists in the female mold portion 22. Therefore, one of ordinary skill in the art would not have a reasonable expectation of success in combining the teachings of Watmough and Sagusa et al. Thus, the third criterion for a proper *prima facie* case of obviousness also has not been met.

For at least the reasons set forth above, Applicants respectfully submit that the cited prior art does not establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a). Thus, reconsideration and withdrawal of this rejection is respectfully requested.

Other Remaining Rejections Under 35 U.S.C. § 103

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Claim 18 is rejected under 35 U.S.C. § 103(a) as being unpatentable over McMillin et al. in view of Fukasawa et al. (U.S. Patent No. 5,310,453); claim 25 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Sagusa et al. in view of McMillin et al.; and claim 24 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Sagusa et al. in view of Wang et al.

Dependent claim 18 depends from independent claim 16, and dependent claims 24 and 25 depend from independent claim 1. As discussed above, independent claims 1 and 16 are patentably distinguishable over McMillin et al. and Sagusa et al. Moreover, neither Wang et al. or Fukasawa et al. cures the deficiency of McMillin et al. and Sagusa et al. Consequently, dependent claims 18, 24, and 25 should also be allowable at least by virtue of their dependency from allowable independent claims 1 and 16. Thus, reconsideration and withdrawal of this rejection is respectfully requested.

#### Conclusion

In view of the foregoing remarks, Applicants respectfully submit that the claimed invention is neither anticipated nor rendered obvious in view of the prior art references cited against this application. Applicants therefore respectfully request the reconsideration of this application, the withdrawal of all of the outstanding rejections, and the timely allowance of all pending claims 1-30.

The Office Action contains a number of statements and characterizations regarding the claims and the related art. Applicants decline to subscribe automatically to any statement or characterization in the Office Action, regardless of whether it is addressed above.

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Respectfully submitted,

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